

REMARKS

The claims are 1-3, 7-19 and 35, of which Claims 1, 2 and 19 are in independent form. Claim 3 has been amended to more clearly define what is regarded as the invention. Claim 35 has been amended solely as to form. Favorable reconsideration is respectfully requested.

In the Office Action, Claim 3 is rejected under 35 U.S.C. § 112, second paragraph, for alleged indefiniteness of the word “cofactor”. Applicants have now amended Claim 3 to recite --crosslinking cofactor--, to make clear that the claim is not intended to encompass coenzymes, but rather a substrate for the phenyl oxidase or phenol hydroxylase which may be used to increase the number of crosslinks formed. Support for this clarifying amendment is located, generally, at page 9, line 27 - page 10, line 24 of the specification. Thus, no new matter has been added, and Applicants respectfully believe the claims to satisfy all of the requirements of 35 U.S.C. § 112. Accordingly, withdrawal of the present rejection is kindly requested.

Claims 1-3, 7, 8, 11, 16, 17, 19 and 35 stand rejected as allegedly anticipated under 35 U.S.C. § 102(b) by European Patent No. 0244688 A2 (*Benedict et al.*), along with Longa SD et al., “*The dinuclear copper site structure of Agaricus bisporus tyrosinase in solution probed by X-ray absorption spectroscopy*”, *The J. Biol. Chem.*, 1996, 271(35): 21025-21030 and the Pierce Biotechnology Inc. online document. Applicants respectfully traverse these rejections.

In alleging anticipation, the broadest possible interpretation is accorded in the Office Action to Applicants’ definition of extensin protein, and particularly to the term “derivative”. With apparent support from the Merriam-Webster Online Dictionary excerpt,

the Examiner contends that a substance derived from extensin may include fragments thereof so that, allegedly, bioadhesive polyphenolic proteins that include the decapeptide sequence AKPSYPPTYK can be considered to be fragments of an extensin protein.

Respectfully, however, Applicants believe the Examiner is selectively reading the definition of “extensin protein” provided in the specification. In particular, the Examiner appears to be overlooking entirely the clause at page 6, lines 1-2 included as a qualifying limitation on Applicants’ definition of “extensin protein”, and clearly stating that any derivative must “retain extensin activity.”

Applicants respectfully submit that it is not possible for the polyphenolic proteins of *Benedict* to exhibit extensin activity—and hence, to anticipate the present invention—because the proteins therein are not derived from plant cell walls as are the extensin proteins of the present invention. As indicated at page 1 of *Benedict*, bioadhesive polyphenolic proteins are originally derived from the mussel genus *Mytilus*, and decapeptides may be obtained from these proteins by the method described in US Patent No. 4,585,585. However, as mentioned in the present application, the methods described therein have not proved to be commercially viable because the polyphenolic protein can only be isolated in small quantities.

Conversely, the extensin proteins of Applicants’ invention are hydroxyproline-rich glycoproteins present in the cell walls of dicotyledonous plants. See specification, page 3, lines 1-2. These proteins can be produced in bulk quantities and have surprisingly been found to have remarkable adhesive properties. According to the MPEP, anticipation requires that “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” MPEP § 2131 at 2100–73 (quoting *Richardson v. Suzuki*

Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). Moreover, “[w]here an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim.” MPEP § 2111.01 at 2100–50 (citing *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999)) (emphasis added). Consequently, because the polyphenolic proteins of *Benedict* are not derived from extensin proteins so as to retain extensin activity, the definition of the term in the claim is not satisfied, thus precluding anticipation.

Further in the Office Action, the Examiner has rejected Claims 9, 10, 12-15 and 18 under 35 U.S.C. § 103(a) as allegedly unpatentable over *Benedict* in view of Longa and the Pierce Biotechnology document, with Claims 9, 10 and 18 rejected further in view of U.S. Patent No. 5,804,170 (*Negishi et al.*); Claims 12 and 13 rejected in further view of U.S. Patent No. 4,976,837 (*Hughes et al.*); and Claims 14 and 15 rejected further in view of U.S. Patent No. 4,038,742 (*Rae*). These rejections are respectfully traversed.

In traversing these rejections, Applicants wish to highlight Section 2141 of the MPEP, stating in relevant part that “[i]n order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.” MPEP § 2141.01(a) at 2100–122 (quoting *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)). In addition, “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” MPEP § 2143.01 at 2100–131 (citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)). As discussed above, *Benedict* contains no disclosure of extensin proteins or derivatives

thereof retaining extensin activity. As to Claims 7-10, while conceding that *Benedict* does not disclose a water-soluble cofactor containing mono- or dihydroxy phenolic moiety comprising catechin or catechol, the Examiner nonetheless purports that it would have been obvious to combine this reference with *Negishi* for its discussion of catechin or catechol. Applicants respectfully disagree.

“When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper.” MPEP § 2142 at 2100–129 (citing *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986)). Applicants do not understand the Office Action as providing sufficient reason why one of ordinary skill would combine *Benedict* with *Negishi*. To begin, the Examiner admits at page 12 that “the composition taught by *Negishi* et al does not directly teach the use of such cofactors (such as catechin or catechol as claimed) with polyphenol oxidase/tyrosinase, and differs in the nature of the intended use of the composition”. Further, this document is directed to deodorant compositions and, more importantly, contains no suggestion that its teaching may be applied to adhesives. There is no disclosure that a protein substrate may be included in the composition, let alone an extensin protein. Accordingly, Applicants believe it unlikely at best that a person of ordinary skill in the art would have considered *Negishi* when addressing the problem of how to provide improved water-resistant bioadhesives.

Applicants respectfully believe the Examiner has selected the disclosure from this reference and combined it in hindsight with *Benedict et al*. Such combination is impermissible and, in any event, does not produce compositions within the scope of the present claims because, principally, there is no disclosure in *Benedict* of extensin proteins

or derivatives thereof. Accordingly, it is respectfully submitted that Claims 7-10 are patentably distinct over the combination of *Benedict* with *Negishi*.

The Office Action further states that Claims 12 and 13 are purportedly obvious over *Benedict* in view of *Hughes*, because of the latter's discussion of blocked di-isocyanate compounds such as Trixene L75, as would be useful in thermo-setting adhesives.

Applicants understand *Hughes* as teaching the use of such compounds with products such as paints, elastomers and other coating materials. In contrast, the present application is directed toward an altogether different invention. It is not clear to Applicants how one of ordinary skill would be motivated to consult the teachings of *Hughes* when this reference contains no disclosure or even suggestion that di-isocyanate compounds could be used in the formation of water-resistant adhesives specifically, or any similar composition generally. “The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.” MPEP § 2142 at 2100–128 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Respectfully, Applicants again submit that the Examiner has selected the disclosure from *Hughes* and impermissibly combined it in hindsight with *Benedict*, without delineating a proper motivation for one of ordinary skill to in fact make such combination. Accordingly, Claims 12 and 13 are believed patentable over the cited art.

Claims 14 and 15 are likewise rejected under § 103(a) under *Benedict*, further in view of *Rae*. This reference is understood as cited in the Office Action for its discussion of the 1,4-benzoquinone formation, resulting in curing and crosslinking of butyl

rubber elastomers. As before, Applicants respectfully submit there to be no teaching or suggestion that this compound may be used for the formation of water-resistant adhesives anywhere in the cited reference. One of ordinary skill would therefore not have considered the disclosure of *Rae* when addressing the problem of how to provide improved water-resistant bioadhesives.

Here, the Examiner has again selected an isolated disclosure from an unrelated field and combined this in hindsight with the disclosure of *Benedict et al.* to be used against the claims. “However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.” MPEP § 2142 at 2100–128. Such combination is believed impermissible and, moreover, would not result in compositions within the scope of the present claims because there is no disclosure of extensin proteins, or derivatives thereof, in the base reference, *Benedict et al.*.

In summary, none of the prior art cited in the Office Action relates to extensin proteins or their derivatives. Neither *Negishi et al.*, *Hughes et al.*, nor *Rae* contain any suggestion as to how their teaching may be applied to formation of water-resistant adhesives as claimed herein. Accordingly, the subject matter of the present claims is considered to be patentable over the cited documents, and withdrawal of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

The other claims in this application depend from one or another of the independent claims discussed above and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

Wherefore, it is respectfully submitted that the presently claimed invention is not disclosed or suggested by the art of record. Accordingly, it is respectfully requested that the claims be allowed and the case passed to issue.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,


Raymond R. Mandra
Attorney for Applicants
Registration No.: 34,382

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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